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IN THE

Supreme Court of the United States

OCTOBER TERM, 1960.

No. 553

ARMOUR RESEARCH FOUNDATION OF ILLINOIS INSTITUTE OF TECHNOLOGY,
Petitioner,

vs.

C. K. WILLIAMS & CO., INC., ET AL.,
Respondents.

REPLY BRIEF OF PETITIONER, ARMOUR RESEARCH FOUNDATION.

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Respondents' brief seeks to perpetuate and compound the error of the Courts below which arose from a failure to consider documentary evidence that clearly establishes that the production of a magnetic recording tape embodying the Camras criteria would not have been "obvious at the time the invention was made to a person having ordinary skill in the art" (Title 35 U.S.C. Sec. 103). We have pointed out in our petition (pp. 12 and 13) deficiencies in the prior art relied upon by respondents and by the lower courts. Even absent such deficiencies, we submit that the evidence here establishes that the existence of such prior art did not render the invention defined by Camras' claim 26 "obvious".

1. Documentary evidence in this record, specifically the OSRD Report No. 5325 (PA 2751) represented the best efforts of those "skilled in the art" in 1945. This Report specifically points to the production of a synthetic magnetite by the defendant, C. K. Williams & Co. (PA 2767), and concludes (PA 2765) "that magnetite powder gives the best recording results, in that magnetite-coated tapes can be run slower to obtain a given fidelity than any other * * *". Yet the magnetite there referred to as made by C. K. Williams and sold as Raven Black or BK-247 was the low coercive force ($H_c = 115$-130), non-acicular, ferrosoferric oxide (PA 2185; 2788) that was used in the Brush Soundmirror tape (PA 1505) and that the Camras oxides completely displaced (PA 765; 951).

The reference in the OSRD Report (DA 479) to "a coercive force between 100 and 200 oersteds", so much stressed by respondents (Brief, 15), is satisfied by the low coercive force BK-247; the range of 100 to 200 oersteds includes the 115-130 oersteds value of BK-247; it does not include the 245 to 330 oersted* range of claims 25 and 26 of the Camras patent.

Consequently, the OSRD Report, representing as it does the concerted efforts of the Brush Development Company, the Battelle Memorial Institute and the Case School of Applied Science (PA 2753-4) to develop an "improved magnetic signal carrier which would offer an increased economy in regard to the total required carrier volume" (PA 2753), fell far short of anticipating the Camras magnetic tape. Specifically, the best tape of the Report failed to provide or even suggest the following features of the tape defined in claim 26 of the patent in suit:

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* This range is specifically supported by Specimens W and X of Table V, at H = 1000 (PA 3574; 610).

(a) "elongated crystals"
BK-247 was non-acicular (PA 2185)

(b) "an H_c within the range of 245-330"
BK-247 had an H_c of 115-130 (PA 2788)

(c) "a B_r of above about 500 gauss"
BK-247 had a B_r of 360 (PA 1093)

It should be borne in mind that these experts (among which, on the face of the document, respondent, C.K. Williams & Co., Inc., should be included) had available all of the prior art that was urged by respondents and reconstructed by the Courts below to find in effect that the vastly improved magnetic recording tape was "obvious".

The evidence leads to an answer that is directly contrary.

If the Camras invention was "obvious", does it not appear strange that C. K. Williams, an active collaborator in this 1945 OSRD Report, did not immediately recommend its 277 and 278 oxides, which it claims to have produced for another purpose in 1942-3, for use as tape oxides? Instead, it chose to furnish its low coercive force BK-247 which was found by the then experts to "give the best recording results".

2. If the Camras invention was "obvious", why did not Mepham (a company associated with respondent, C. K. Williams) furnish these Nos. 277 and 278 oxides, or one of the other alleged anticipatory oxides of the prior art to Minnesota when the latter, in December 1946, after having made recording tape with the Camras oxide, requested magnetic recording tape oxides having "a high ratio of magnetic coercive force to remanence" (PA 2144)? The documentary evidence in this record shows that Williams (Mepham) first told Minnesota that "At this time we know

nothing about the ratio of coercive force to remanence of our various magnetic materials" (PA 2145—Letter dated January 14, 1947). The samples that Mepham then supplied to Minnesota were not the 277 and 278 oxides. On the contrary, Mepham, as late as January 15, 1947, supplied its low coercive force BK-247 together with samples of "both a coarse and fine ground *natural* magnetite" (PA 2147). Thus, despite the then existence for many years of the prior art which respondents and the lower courts* now extravagantly extol, the Camras invention was not "obvious" to the experts of Mepham-Williams even though the furnishing to Minnesota by Mepham at that time of a magnetic recording tape oxide equalling the performance of the Camras tape undoubtedly would have been commercially advantageous to Mepham. The "obviousness" now claimed and erroneously found by the lower courts did not exist when it would have been to the distinct commercial benefit of respondents to recognize it.

3. Even after Minnesota had commercialized the magnetic recording tape of the Camras invention (beginning in May of 1947—PA 953) the "obviousness" of that invention did not become apparent to respondents. In October of 1947 (PA 1293), Brush, a customer of Mepham, spurred by the Minnesota tape of the Camras invention**, requested a better magnetic recording tape oxide than the BK-247 which Mepham was then furnishing. In compliance with this request, Mepham sent Brush twelve samples (PA 2088), only two of which had a coercive force of over 200 oersteds and were indicated by Brush as of "possible interest" (PA 2089).

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* The District Court for the Southern District of New York did not accept the defenses of alleged prior public use.

** As of this date, the Camras patent application had been filed and Minnesota was manufacturing and selling magnetic recording tape of the Camras invention (PA 953; 1405).

4. But respondents needed to be further informed as to the invention which their customer Brush was demanding and which is now claimed to have been "obvious". While they waited for this "obviousness" to develop, Armour's licensee Minnesota had made sales of magnetic recording tape of the Camras invention which had exceeded $225,000 by the end of 1948 (PA 1405).

In the meantime, National Standard Co., another Armour licensee, had secured from Mr. Camras through visits to Armour in March 1947 (PA 2781-4) and again on *September 17, 1948* (PA 2785-7) full details of the Camras invention including the starting material, processing and the making of tape including the "brown powder" tape* being sold by Minnesota in 1948 (PA 2786).

In further pursuit of what they now claim, and the lower courts found, to have been "obvious", respondents' experts, Rodrian and Stephans, visited National Standard Co. on *September 22, 1948* and obtained complete information as to the Armour (Camras) magnetic recording tape and its production (PA 2777-87). This information includes full details of the Camras method, including the fact that Camras used the Mepham red iron oxide, specified as RY-2598 (PA 2779). It was at this meeting that respondent learned that Camras was using an acicular starting material "about 1/10 micron in diameter and about ½ micron long" (PA 2782) and was making from such starting material (by a process then disclosed to respondents) a material "having a coercive force varying from 300 to 375 and a B_r up to 600". Respondents also learned at that time that "3M is (was) using the Armour method for their magnetic oxide".

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* A tape specifically defined by claim 26 in suit.

Admittedly (PA 1218-9), *respondents made no commercial high coercive force tape oxide until after this visit to National Standard in 1948.*

5. The *documentary* evidence in this record makes it abundantly clear that

(a) The Camras invention was not "obvious" to the experts (including respondents) who in the 1945 OSRD Report No. 5325 (PA 2751) recommended the low coercive force "magnetite powder" (PA 2767) BK-247 (PA 2185; 2788) as giving "best recording results".

(b) The Camras invention was not "obvious" to respondents in December 1946 when (despite the alleged existence of their own Nos. 277 and 278 oxides and the other prior art upon which respondents and the lower courts rely) they failed to submit a high coercive force magnetic recording tape oxide to Minnesota, even though Minnesota which then had experimentally coated tape with the Camras oxide had requested oxide having "a high ratio of magnetic coercive force to remanence".

(c) Respondents, despite their present claim of "obviousness" and the urgent demands of their customer Brush for an improved tape oxide, failed to commercially produce any high coercive force oxide for magnetic recording tape until (1) *after* Minnesota had widely commercialized the Camras invention, and (2) after respondents had secured complete and detailed information as to the Camras invention from Armour's then licensee, National Standard Co.

6. The insincerity of respondents' claim of "obviousness" is further apparent from respondents' position after

its appropriation of the Camras invention. The extent of such appropriation and the meaningfulness of the Camras criteria are evident from Plaintiffs' Exhibits No. 2 (PA 1952), No. 3 (PA 1953) and No. 11 (PA 1962). The "policy" of respondents (PA 1533) in respect of patent infringement which was stated by respondent's President, Mr. L. K. Ayers, is as follows (PA 2075):

> "It assumes no responsibilities from conflict with patents or patent litigation."

Mr. Ayers admitted that the "issuance of the Camras patent had a distinct bearing on our stating this policy • • •" (PA 1533). Is this consistent with respondents' claim that the Camras invention of Claim 26 is "obvious"?

7. Contrary to respondents' contention (Brief, 13) that "there were new features of both the tape backing and coating" in the Scotch tape forming the subject matter of the *Minnesota* v. *International* case, 159 F. 2d 554, the Court of Appeals flatly stated at page 556:

> "The elements involved in the patent are quite old. The straight unmoistureproofed cellophane was in wide-spread use in 1913. Rubber-resin adhesives were used in the manufacture of shoes as early as 1905, and non-fibrous films were known and used in the photographic art in the last century."

8. Neither respondents nor the lower courts have dealt with this question of "obviousness" nor with the evidence above outlined which establishes that the invention of Camras claim 26 clearly was not obvious to those "having ordinary skill in the art". After (and only after) that invention had created a new industry did respondents modify and reconstruct non-analogous prior art in the light of knowledge acquired from the Camras patent

to provide what the lower courts have erroneously found to be anticipations.*

The evidence here strongly suggests that but for Minnesota's successful commercialization of the Camras invention such prior art, including respondents' own abandoned experiments, would still remain unused and forgotten.

At no time in the history of our Patent Laws has there arisen a more apt occasion for the application of the principles expressed by this Court in *Diamond Rubber Co.* v. *Consolidated Tire Co.*, 220 U. S. 428, where Mr. Justice McKenna, in delivering the Opinion of this Court, stated at pages 434 and 435:

> "• • • Many things, and the patent law abounds in illustrations, seem obvious after they have been done, and, 'in the light of the accomplished result,' it is often a matter of wonder how they so long 'eluded the search of the discoverer and set at defiance the speculations of inventive genius.' *Pearl* v. *Ocean Mills*, 11 Off. Gaz. 2. Knowledge after the event is always easy, and problems once solved present no difficulties, indeed, may be represented as never having had any, and expert witnesses may be brought forward to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skillful attention. But the law has other tests of the invention than subtle conjectures of what might have been seen and yet was not. It regards a change as evidence of novelty, the acceptance and utility of change as a further evidence, even as demonstration. • • •"

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* Petitioner again urges that it is not a question of what a person skilled in the art "might readily provide" (PA 3540) from "the sum total of the relevant prior art", but what the prior art itself unmistakably and clearly discloses. It was only with the aid of the Camras teachings that the inter partes demonstrations "succeeded".

This decision has been cited on the point quoted as the controlling authority in no less than sixty separate and subsequent court decisions.

Here the lower courts found and respondents claim no anticipation of the magnetic recording tape defined by claim 26 of the Camras patent. Neither the opinion below nor respondents' brief controvert documentary evidence of record establishing that the invention defined by that claim was not "obvious to one having ordinary skill in the art".

We respectfully submit that our Petition should be granted in order that full and proper effect may be given to Title 35 U.S.C. Sec. 103 and to the decisions of this Court.

Respectfully submitted,

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C. K. WILLIAMS & CO., INC., ET AL.,

Respondents.

PETITION FOR REHEARING OF PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SEVENTH CIRCUIT.

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Petitioner, Armour Research Foundation of Illinois Institute of Technology* hereby petitions for a rehearing of its Petition for Writ of Certiorari filed herein on November 28, 1960, as No. 553, October Term, 1960. Said original Petition was denied on February 20, 1961, along with the Cross Petition for Certiorari filed by C. K. Williams & Co., Inc., as No. 606.

Petitioner thereafter, to wit on March 13, 1961, filed an Application for Extension of Time to File Petition for Rehearing of an Order Denying Petition for Writ of Certiorari. Upon consideration of that application, Mr. Justice Clark extended the time for filing a petition for rehearing to and including April 17, 1961.

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*Sometimes referred to herein as "Armour".

Prior to the last-named date, petitioner filed a renewed Application for Extension of Time. Such renewed Application resulted in an Order, dated April 13, 1961, extending the time for filing a petition for rehearing to and including May 17, 1961. Said Order was accompanied by a letter dated April 16, 1961, from the Clerk of the United States Supreme Court, stating that "no further extension will be granted," but advising that petitioner "may submit a petition for rehearing by May 17" incorporating the facts as outlined in petitioner's application for extension of time.

This renewed petition for rehearing is being made pursuant to the permission so granted.

POSSIBILITY OF A CONFLICT OF DECISIONS BETWEEN SEVENTH AND SECOND CIRCUITS.

An appeal is currently pending in the United States Court of Appeals for the Second Circuit, Appeal No. 26,805, *Audio Devices, Inc., Plaintiff-Appellee*, v. *Minnesota Mining & Manufacturing Company, and Armour Research Foundation of Illinois Institute of Technology, Defendant-Appellant*. This is an appeal from the District Court's Judgment following that Court's decision holding the Camras Patent No. 2,694,656, the same patent here involved, invalid and not infringed (*Audio Devices, Inc.* v. *Minnesota Mining & Manufacturing Company and Armour Research Foundation of Illinois Institute of Technology*, 190 F. Supp. 189, U. S. D. C., S. D. N. Y., Dec. 19, 1960). Armour, alone, appealed. Its appeal brief was filed March 28, 1961.

By an Order entered by Judge Lumbard in said Appeal No. 26,805, the time for filing Appellee's brief on appeal was set to expire June 8, 1961 and arguments on appeal were set for the week of June 19, 1961, before the Second Circuit Court of Appeals.

There is, therefore, good reason to believe that the United

States Court of Appeals for the Second Circuit will hand down its decision as to said Camras Patent No. 2,694,656 before the 1961 Fall Term of the Supreme Court of the United States.

In order to preserve its substantive rights in the event that there is a conflict of decisions between the Seventh and Second Circuit Courts of Appeal, your petitioner, Armour, owner of said Camras Patent, brings this renewed Petition.

Petitioner submits that it is fully justified by the record in said *Audio case* in believing that the Second Circuit Court of Appeals may reverse the Lower Court's decision. In that decision, in contrast to the decision in the Seventh Circuit, the District Court for the Southern District of New York made no findings based upon the alleged prior public uses that the Seventh Circuit Court held to invalidate the Camras patent; it found the patent invalid solely because of its belief that it was anticipated by and lacked invention over the prior art.

The Camras invention, however, fully responds to all of the tests of patentability enunciated by the Court of Appeals for the Second Circuit in *Reiner* v. *I. Leon Co., Inc.*, 128 U. S. P. Q. 25, 27, 28.

OPINIONS BELOW.

The Opinion of the District Court, reprinted in Appendix to Brief for Plaintiffs-Appellants, PA* 3515-3557, is reported in 170 F. Supp. 871. The Opinion of the Court of Appeals and its denial of Petition for Rehearing, reprinted in Appendix B annexed hereto, is reported in 280 F. 2d 499.

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*PA is the abbreviation for Appendix to Brief for Plaintiffs-Appellants, copy of which is being filed herewith.

JURISDICTION.

The judgment of the Court of Appeals was entered on July 12, 1960 (App. B). The denial of the Petition for Rehearing with respect to such judgment was entered on August 30, 1960.

After the filing of the Petition and Cross Petition for Certiorari and their denial, as aforesaid, petitioner obtained extensions of time up to and including May 17, 1961 within which to submit this Petition for Rehearing.

Federal jurisdiction of the case is based upon 28 U. S. C. Section 1338, this being an action arising under the Patent Laws of the United States.

QUESTIONS PRESENTED.

1. Whether a claim to an invention of a magnetic impulse record member (magnetic recording tape) should be held invalid over prior art represented by a foreign patent and by a U. S. Government report, both extolling magnetic recording media that were promptly and completely supplanted by the vastly superior and immediately commercially accepted magnetic recording tape of the claimed invention, thereby showing an existing but unfilled need that was not solved by the foreign patent nor by said Government report although such solution was the express purpose of said report.

2. Whether a claim to a unitary article of manufacture, in this case a magnetic impulse record member (magnetic recording tape) having as the active magnetic element thereof a layer of magnetic iron oxide particles adherently bonded to a non-magnetic backing, may be declared invalid for lack of invention over prior art, where to reach that conclusion requires the selection of an element, viz., a

specific magnetic iron oxide having a particular combination of physical and magnetic properties not theretofore described in any prior art reference and not theretofore known to be possessed by any magnetic iron oxide that had been disclosed in any prior art reference, and where such conclusion further requires the substitution of such magnetic iron oxide for theretofore known magnetic iron oxides in a prior art magnetic impulse record member contrary to any prior art suggestion that such substitution would result in any improvement over the best prior art magnetic impulse record members theretofore known?

3. Whether an appellate court, in reliance upon Rule 52(a), Federal Rules of Civil Procedure, may refuse to accord to the appellant a full review of the facts as presented by documentary evidence* in the light of the law applicable thereto where such applicable law has not been properly applied by the lower court and if properly applied would produce a different result?

4. Whether the submission by the inventor of magnetic iron oxides to a third party to make up into magnetic recording tape to be returned to the inventor for testing, amounts to a prior public use of the tape where there was no sale of the oxides or of the tape and not even any use or testing of the tape so made until within the statutory year just prior to the filing date of the application first disclosing and claiming such oxides and tape.

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* Williams & Thewlis (PA 3005).
Kraeber & Luyken (PA 3011).
Bureau of Mines Bulletin No. 425 (PA 2913).
Welo & Baudisch (PA 2256).
Johnson British Patent (PA 3647).
OSRD Report No. 5325 (PA 2751).
Correspondence Armour-Minnesota (PA 1957, 2461).
Correspondence Minnesota-C. K. Williams (PA 2143-45).
Correspondence C. K. Williams-National Standard (PA 2777-2804).

STATUTE INVOKED.

The pertinent statutory provisions here invoked are printed in Appendix A annexed hereto, *infra*. They comprise Sections 102(a) and (b), 103 and 282 of Title 35 U. S. C. (Sections of Public Law 593, 82d Congress).

STATEMENT OF THE CASE.

PLEADINGS IN GENERAL.

This action was filed as C. A. 3200 by Armour on May 27, 1955, charging infringement by Williams of the Camras Patent No. 2,694,656 (PA 45). Respondent Williams filed its answer and a counterclaim for judgment declaring the patent invalid, unenforceable and not infringed (PA 49).

On order of the District Court, Minnesota was brought in as an additional party plaintiff (PA 66).

Civil Action No. 3438 was instituted by Armour on January 24, 1956 against Technical Tape (PA 1).

Civil Actions Nos. 3200 and 3438 were consolidated for trial (PA 109).

The District Court held the patent in suit invalid and for that reason not infringed (PA 3556).

The Court of Appeals affirmed the holding of invalidity.

BACKGROUND OF MAGNETIC RECORDING.

The art of magnetic recording is an old one. Its usefulness was demonstrated by the Germans during World War II to such an extent that our Government, in 1945, delegated experts including representatives of Brush Development Company (a pioneer American manufacturer of mag-

netic recorders) to investigate the subject with a view to recommending the best magnetic tape for use in such recording. With all of the prior art available, these experts concluded in their Report (O. S. R. D. Report No. 5325, dated June 30, 1945; PA 2751-2772) that the best magnetic tape was that coated with low coercive force "Magnetite" (PA 2765-2768), a material used by the Germans and furnished in the United States by respondent, C. K. Williams & Co., Inc., under the designation "BK 247." This material had a coercive force, H_c, of 115 to 130 (PA 2788) which corresponded with that of the German tape (PA 703).

This *low coercive force tape*, made with BK 247 or equivalent material used by the Germans, was objectionable in the following important respects, which prevented its large scale adoption and use:

(a) High tape speeds in the order of one meter per second were required in order to satisfactorily record and reproduce high frequency notes (signals). This involved tape requirements which were unwieldy and uneconomical—more than 10,800 feet of prior art tape to record a one hour program!

(b) Relatively low output (signal to noise ratio) made the tape impractical for radio broadcasting, television recording, telemetering, instrumentation and many important scientific uses now satisfactorily served by the tape of the patent in suit (PA 926-7).

CAMRAS PATENT IN SUIT NO. 2,694,656.

Marvin Camras, a young scientist associated with petitioner, Armour Research Foundation of Illinois Institute of Technology, who previously had made an important contribution to the art of magnetic recording (PA 505), set about in late 1945 to provide a magnetic recording tape that would overcome the objections found in the best that

the Government experts (with all of the prior art presumably available to them) had been able to suggest in the O.S.R.D. Report No. 5325 published in the summer of that year. By the end of the year 1946, Camras had produced and thoroughly tested magnetic recording tapes that solved the existing problems and laid the foundation of a substantial industry. Significant features of the tapes invented by Camras were (a) a coercive force, (H_c), of well over 200 oersteds* at fields of H=1000; (b) a synthetic magnetic iron oxide coating (Fe_3O_4 or gamma Fe_2O_3) composed of acicular particles preferably having a maximum dimension of less than 1.5 microns and (c) having a high remanence (ability to retain recorded signals) of above 500 gauss.

Tapes made in accordance with the Camras invention by Minnesota Mining & Manufacturing Company (a licensee of petitioner and a co-plaintiff below) which were tested in 1947 by Station KUOM of the University of Minnesota and found satisfactory for use in radio broadcasting of music at tape speeds of 7½ inches per second, or only 2700 feet for a one hour program, where Brush tape (PA 765) (admittedly the best of the prior art) had been found completely unsuitable for that purpose (PA 764).

Tapes of the Camras invention used by Toogood in commercial recording were found to provide an economical advantage of two-to-one over prior art tapes (PA 811) despite a 40% higher price charged for the Camras tape (PA 800).

After introduction of the Camras tape by petitioner's licensee, Minnesota Mining & Manufacturing Company, in 1947 and sales during that year of $15,000—sales of the patented tape by Minnesota rose phenomenally each year until sales in 1957 were over $8,000,000 (PA 1405). Peti-

* Claim 26 to which this petition is limited, specifies 245 to 330 oersteds.

tioner, a not-for-profit research corporation, was paid royalties of over $700,000 during this period (PA 1406).

Respondent, C. K. Williams & Co., Inc. produces magnetic iron oxide which it sells to respondent, Technical Tape Corporation, and other manufacturers of magnetic recording tape. This oxide and tape produced therewith embody the Camras invention including the significant features of a coercive force of 245 to 330 oersteds, acicular particles having a maximum dimension of 1.5 microns or less and high remanence (Px. 2; Px. 3; PA 1952-3). Significantly, respondent Williams did not even submit this high coercive force magnetic oxide to makers of magnetic recording tape until after the tape of the Camras invention was on the market (PA 937: 1218-9). Respondent Williams did not produce this oxide commercially (PA 1218-9) until it had acquired full details of the Camras invention from petitioner's then licensee, National-Standard Company of Niles, Michigan (PA 2777-91).

THIS PETITION IS DIRECTED SOLELY TO CLAIM 26 IN SUIT.

This Petition is specifically and solely directed to claim 26, which is drawn to a magnetic impulse member. Being dependent upon claim 25, claims 25 and 26 must be read together:

> "25. Ferromagnetic iron oxide selected from the group consisting of a synthetic ferroso-ferric oxide, Fe_3O_4, and of a synthetic gamma ferric oxide, Fe_2O_3, adapted to form an element of a magnetic impulse record member, said iron oxide consisting essentially of uniformly small elongated crystals of less than about 1.5 microns maximum dimension having a length-to-width ratio of about 2.5 to 1 and higher, and having a cubic crystal lattice structure and a coercive force, H_c, within the range of 245 to 330 and remanence, B_r, of above about 500 gauss."

"26. A magnetic impulse record member having a non-magnetic carrier and a coating adherently bonded thereto of a binder and magnetic material, said magnetic material being the ferro-magnetic iron oxide defined in claim 25 and having a B, versus H characteristic that rises most rapidly at fields between 200 and 600 oersteds and relatively slowly at fields between 0 and 200 oersteds and at fields above 600 oersteds."

In holding claim 26 to be invalid over prior art not itself disclosing the invention of the patent in suit, the Court of Appeals failed to apply the doctrine laid down in *Dewey & Almy* v. *Mimex* (C. A. 2, 1942), 124 F. 2d 986, 989:

"No doctrine of the patent law is better established than that a prior patent or other publication to be an anticipation must bear within its four corners adequate directions for the practice of the patent invalidated. If the earlier disclosure offers no more than a starting point for further experiments, if its teaching will sometimes succeed and sometimes fail, if it does not inform the art without more how to practice the new invention, it has not correspondingly enriched the store of common knowledge, and it is not an anticipation." Citing *Seymour* v. *Osbourne*, 11 Wall. 516, 555; *Tilghman* v. *Proctor*, 102 U. S. 707, 711, 712; *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.*, 261 U. S. 45, 66, and others.

The iron oxide prior art not only failed to disclose synthetic, acicular magnetic iron oxides of over 200 oersteds (H_c 245 to 330) coercive force, it contained no suggestion that any of the magnetic iron oxides that it did disclose were adapted for use in magnetic recording tape. The Johnson patent (PA 3647-9) did not supply this suggestion since the patent showed complete satisfaction with the use in tape of the oxides therein disclosed, and these oxides, while alleged in the patent to have "high" coercive force values actually had low coercive force values (PA 2376-7) when compared to the Camras oxides (H_c values of 110 as against H_c values of 245-330 for Camras).

The OSRD Report No. 5325, coming as it did chronologically after all of the prior art held to anticipate the Camras patent, by its very recognition that "the readily measurable 'effective' magnetic properties which are of practical interest indicate a coercive force between 100 and 200 oersteds and a remanence of only a few hundred gauss," and its conclusion that magnetite powders (exemplified by the 115 to 130 coercive force BK-247) gave the best results in tape recording, contraindicates any concept, ahead of Camras, of the use of magnetic iron oxides having coercive force values of 245 to 330 oersteds and remanence values above 500 gauss in combination with the other magnetic properties and the physical characteristics called for by claim 26.

The unobviousness of such concept is further demonstrated by the fact that although respondent Williams (and its predecessor Mepham) were suppliers of tape oxides to manufacturers of magnetic recording tape (PA 1505) and although Williams claimed that in 1942 (PA 1286-7) it had oxides (the 277 and 278 oxides) found in 1955 (PA 1359) to possess a combination of physical and magnetic properties fulfilling some if not all of the Camras criteria, respondent nevertheless continued to make its low coercive force BK-247 until forced by competition as a result of Minnesota's success with the Camras oxides and tape to go into the manufacture of an infringing oxide.

REASONS FOR GRANTING THE WRIT.

1. The Court of Appeals held the tape claims (which would include claim 26, the only claim involved here) to be clearly invalid over the prior art, "especially in view of Johnson and the teachings of OSRD Report 5325" (App. B, p. 24).

In so holding tape claim 26 invalid, the Court of Appeals

applied a standard of invention directly contrary to the non-obvious test of Section 103 (App. A) and contrary to the established standard of invention test laid down by this Court in the *Eibel* case, 261 U. S. 45, 66, and others.

That the magnetic impulse record member (magnetic recording tape) of claim 26 was far from obvious at the time the Camras invention was made is abundantly clear from the following undisputed facts:

(1) The German magnetic tape art as it existed at the end of World War II is fairly represented by the Johnson (I. G. Farben) British Patent of 1936 (PA 3647). Such German tape had a coercive force, H_c, of about 110 oersteds (PA 1087-8). The Johnson patent discloses no numerical value for the allegedly "high" coercive force of its magnetic iron oxides, but the highest value obtained by reproduction of any of its examples was 110 oersteds (PA 2376-7).

(2) In about 1945-46, the Brush Development Company produced a tape recorder, called the "Soundmirror", with which was used a magnetic recording tape having a coercive force of around 115 to 130 oersteds (PA 2788). This tape, operated at 7½ inches per second (PA 768), proved unsuitable for critical uses (PA 764-5). The Brush and German tapes were the only commercial tapes available prior to 1947.

(3) The U. S. Government sponsored an extensive investigation headed by Brush Development Company to find the best magnetic recording media. OSRD Report No. 5325, dated June 30, 1945 (PA 2751), based upon such investigation, concluded that tape coatings of "magnetite" (H. of 115 to 130; PA 2788) gave the best recording of all materials investigated. The Brush and German tapes used "magnetite".

(4) At least as early as March 1947 (PA 2181)

Camras had completed his invention of a magnetic recording tape using synthetic acicular Fe_3O_4 or gamma Fe_2O_3 having the magnetic properties, including a coercive force of 245 to 330 oersteds, such as defined by claim 26. Camras filed July 25, 1947.

(5) During 1947 and 1948 sales of the high coercive force tape embodying the Camras invention exceeded $200,000 and by the tenth year after introduction of the tape, sales of tape covered by the patent exceeded $8,000,000 (PA 1405). A totally new industry was born in this country.

(6) Although C. K. Williams & Co., defendant below, had furnished the low coercive force "magnetite" to the Brush Development Company, it was not until after tape embodying the Camras invention was on the market, and after Williams had obtained full details of the Camras invention through an Armour licensee (PA 2779-87), that Williams first commercially made a tape oxide having a high coercive force (H. of 250 and over) (PA 1218-19).

(7) The low coercive force tape used in the Brush Soundmirror was promptly displaced by the Camras-type commercial tape even though the latter was more expensive (PA 766; 800-1). After such displacement, and after attempting to improve the Brush tape in cooperation with defendant Williams, Brush became a distributor of the Camras-type commercial tape (PA 951-2). The prior low coercive force tape disappeared from the market and the sales of the Camras-type, high coercive force tape grew by leaps and bounds.

The change from a low coercive force prior art tape of 110 to 130 oersteds to the high coercive force Camras tape defined by claim 26 as a coercive force of from 245 to 330 oersteds was just as much of an unobvious change as that

made by Eibel (261 U. S. 45) in the pitch of a Fourdrinier wire, of which this Court said, page 68:

> "* * * We can not agree with the Circuit Court of Appeals that the causal connection between the unequal speeds of the stock and the wire, and the disturbance and rippling of the stock, and between the latter and the defective quality of the paper in high speeds of the machine was so obvious that perception of it did not involve discovery which will support a patent. The fact that in a decade of an eager quest for higher speeds this important chain of circumstances had escaped observation, the fact that no one had applied a remedy for the consequent trouble until Eibel, and the final fact that when he made known his discovery, all adopted his remedy, leave no doubt in our minds that what he saw and did was not obvious and did involve discovery and invention."

Like the Eibel invention, the Camras invention promptly and completely supplanted the prior art counterpart. It has done as much for the magnetic recording art as Eibel did for the paper making art.

2. In holding claim 26 invalid on the ground of anticipation or of lack of invention over the prior art, the Court of Appeals adopted a standard of invention contrary to the non-obvious subject matter test of Section 103 (App. A) and contrary to the established standards of this Court. The Court of Appeals attributed to the prior art knowledge that was first made available by Camras. It failed completely to apply the test of whether the Camras invention would have been obvious upon a comparison between the prior art and the subject matter of the Camras invention as a whole *at the time the invention was made.*

The Court of Appeals' decision holding claim 26 invalid over the prior art violates the statutory requirement that "A patent shall be presumed valid" (Sec. 282, App. A.) since, although the Court referred to prior art and portions

thereof not actually cited by the Patent Office against the Camras application, such prior art was no more pertinent than that placed of record by the Patent Office against the Camras patent. The Johnson patent, Bureau of Mines Bulletin No. 425 and Welo & Baudisch were all overcome in the Patent Office (PA 3576). Of the further prior art relied upon by the Court, none related in the remotest way to tape or tape oxides.

Contrary to the Court's assumption, the tape made from the oxides of the Williams and Thewlis demonstration did not possess the magnetic properties called for by claim 26 (PA 1949-50).

The oxides of the Kraeber & Luyken demonstration were produced from deliberately chosen Camras type starting material, not from the Merck's iron hydroxide specified by Kraeber & Luyken (PA 1651-2).

Welo & Baudisch not only fails to disclose synthetic magnetic iron oxides adapted for use in magnetic tape but the oxides of the Welo & Baudisch demonstration, by comparison with the Camras oxides (see PA 2176), were not characteristically acicular (see PA 2842-3), and the tape (IOT, PA 1427) made therefrom had a coercive force value of only 210 at H = 1000, well outside of the claimed range of 245-330 oersteds.

None of the tapes of the *inter partes* demonstrations was successfully tested in actual performance on a magnetic tape recorder. The results of such demonstrations should therefore have been rejected by the courts below.

A basic principle of patent law that has been long established and uniformly followed for many years was early expressed by this Court in *Bates* v. *Coe*, 98 U. S. 31, 48, as follows:

> "Where the thing patented is an entirety, consisting of a single device or combination of old elements,

> incapable of division or separate use, the respondent cannot escape the charge of infringement by alleging or proving that a part of the entire thing is found in one prior patent or printed publication or machine, and another part in another prior exhibit, and still another part in a third one, and from the three or any greater number of such exhibits draw the conclusion that the patentee is not the original and first inventor of the patented improvement."

See also this Court's decision in *The Goodyear Tire & Rubber Company, Inc., et al.* v. *Ray-O-Vac Company*, 321 U. S. 275, 279 (1944) and cases cited under Footnote 4.

The Patent Office tribunals have repeatedly and consistently followed the rule set forth in *Bates* v. *Coe*. The law is stated in numerous decisions of the Court of Customs and Patent Appeals that an application may not be rejected upon the basis of a plurality of references, none of which discloses the combination of elements, even though all taken together may show the separate elements involved, unless there was a suggestion in the prior art for doing what the applicant has done. The test as stated in *Application of Shaffer*, 229 F. 2d 476, 479 (C. C. P. A.—1956) is:

> "namely, whether the prior art suggests doing what an applicant has done. • • • (citing authorities). The foregoing cases, in our opinion, stand for the proposition that it is not enough for a valid rejection to view the prior art in retrospect once an applicant's disclosure is known. The art applied should be viewed by itself to see if it fairly disclosed doing what an applicant has done. If the art did not do so, the references may have been improperly combined."

When Congress codified the law of patents in the Patent Act of 1952, it provided in Section 103 that a patent might be invalid on the basis of prior art

> "if the differences between the subject matter sought

to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art • • •".

3. In its decision, here (App. B, p. 30), the Court of Appeals correctly pointed out that it could only disregard the findings of the District Court "if they are clearly erroneous". The Court of Appeals then went on to say that "factual matters in a patent case must be tried and decided by the trial judge in precisely the same manner as those of any other kind of lawsuit • • •", citing *Armour & Co.* v. *Wilson & Co.*, 274 F. 2d 143, 152, 156 (C. A. 7, 1960).

The *Armour* case, however, recognizes (pp. 152-157) that this Court in *Great Atlantic & Pacific Tea Co.* v. *Supermarket Equipment Corp.* (1950), 340 U. S. 147, 148, granted certiorari, notwithstanding concurrence of a District Court and the Court of Appeals in holding claims valid, on the ground that such courts had not applied to the facts the appropriate standards of invention. That, we submit, is the situation here (except that in this case both the District and Appellate Courts held the Camras patent invalid, rather than valid).

In the instant case, the Court of Appeals for the Seventh Circuit held (App. B, p. 33) that there is credible evidence to support the Court's findings and conclusions with respect to the prior art, but it did not, we submit, either itself carefully review the documentary evidence as represented by the OSRD Report No. 5325, nor did it apply the proper standard of invention to the question of whether the prior art, when considered under the Documentary Rule, as set forth in *Kiwi Coders Corporation* v. *Acro Tool & Die Works* (7 Cir., 1957), 250 F. 2d 562, 568, anticipated the tape invention defined by claim 26 of the Camras patent.

Specifically, the proper standard of invention applicable

to the combination defined by claim 26 was not applied by the District Court (PA 3554) to its Finding (59) that:

> "The record member claims of the patent claimed a combination which only united old elements with no change in the respective functions • • •."

This is not such a finding as should, in and of itself, result in a conclusion that the record member claims are invalid. A similar finding that the elements of the patented tape were old, was reached in *Minnesota Mining & Mfg. Co.* v. *International Plastic Corporation, et al.* (Jan. 9, 1947, C. C. A. 7), 159 F. 2d 554, 556, yet the patent was held valid. The standard, or the test, of invention that should be applied to the record member claim 26 is:

> Do the elements, even if themselves old, cooperate and function together to produce an article having unobviously superior performance characteristics?

In the case of the tape of claim 26, such tape not only promptly and substantially completely replaced the prior art tapes but made possible the otherwise impracticable use of magnetic tape for the economic recording at slow tape speed of radio and television programs.

Both the District Court and the Court of Appeals, in concluding that claim 26 is invalid, failed to apply the standard of invention laid down by this Court in *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381, wherein the Court held:

> "• • • It may be safely said that if those skilled in the mechanical arts are working in a given field and have failed after repeated efforts to discover a certain new and useful improvement, that he who first makes the discovery has done more than make the obvious improvement which would suggest itself to a mechanic skilled in the art, and is entitled to protection as an inventor. There is nothing in the prior art that suggests the combined operation of the Golding patent in

suit. *It is perfectly well settled that a new combination of elements, old in themselves, but which produce a new and useful result, entitles the inventor to the protection of a patent. Loom Company* v. *Higgins*, 105 U. S. 580-591." (Emphasis added.)

4. In 1946, prior to the running of the statutory year against the Camras application, filed July 25, 1947, Camras sent some of his magnetic iron oxides to Minnesota (PA 2459) to be coated on tape and then tested by Camras. Minnesota carried out a laboratory coating of tape with such oxides and returned the coated tape to Camras (PA 2462-3). Minnesota did not itself test the coated tape; the testing was done by Camras (PA 1959-60). It held the unused oxides, subject to Camras' instructions (PA 2462-3).

There was no use or sale by Minnesota of the coated tape; there is no evidence that Minnesota tested the tape in any way. On the contrary, the evidence is clear that this tape was first tested by Camras and the tests reported back to Minnesota on August 26, 1946 (PA 1959), *after* the beginning of the statutory year.

As to whether this transaction constituted a prior public use, the Court of Appeals said the question was "not without difficulty" (App. B, p. 34), but went on to hold that it was such a prior public use as invalidated the Camras patent. In reaching this conclusion, *the Court of Appeals, like the District Court, failed to distinguish between the powder and the tape.* However, even more importantly, neither Court seems to have appreciated that there was no actual reduction to practice of either the oxides or the tape until Camras completed his testing of the tape in August 1946, *within* the statutory year.

When, as here, it is clear that there was *no use* of the tape within the statutory year, the error of the Court of Appeals in stating that the "burden fell upon plaintiffs

to establish that any use was experimental" (p. 506) becomes most apparent.

Consequently, both Courts failed to apply the law laid down by this Court in *Elizabeth* v. *Pavement Company*, 97 U. S. 126, 135:

> "It would not be necessary, in such a case, that the machine should be put up and used only in the inventor's own shop or premises. He may have it put up and used in the premises of another, and the use may inure to the benefit of the owner of the establishment. Still, if used under the surveillance of the inventor, and for the purpose of enabling him to test the machine, and ascertain whether it will answer the purpose intended, and make such alterations and improvements as experience demonstrates to be necessary, it will still be a mere experimental use, and not a public use, within the meaning of the statute."

It was not until Camras had tested the tape coated by Minnesota with the Camras oxides that either the tape or the oxides were actually reduced to practice, *Stearns* v. *Tinker & Rasor* (C. A. 9, 1955), 220 F. 2d 49, 56. In the absence of any actual reduction to practice and of any actual sale, there can be no public use or sale within the meaning of the statutes. *Magee* v. *Coca Cola Company* (C. A. 7, 1956), 232 F. 2d 596, 600.

In stating, as the Court of Appeals did (p. 506), that "neither Camras nor Armour sought the aid of 3M in connection with oxides or their use on tapes," and that "there was no cooperative relationship between Armour and 3M," the Court ignored the documentary evidence (Dx. K-5, PA 2462-3; and Px. 10-A, PA 1959-60). The latter document establishes that even as of August 26, 1946, well within the statutory year, Camras was not satisfied that his invention was beyond the experimental stage for he then explicitly stated to Minnesota as follows:

> "Because of the experimental nature of the work,

and because we think that we will have something better in the near future, we do not feel that samples containing our trial powders should be furnished to other companies until we have had a chance to complete our own studies. Mr. Gibbons assured us that you would cooperate in this respect."

This latter document (Px. 10-A, PA 1960) also shows that the tapes made by Minnesota and tested by Camras were found by Camras to have remanences (B_r) of only 272 and 372, far below the "above about 500 gauss" required by claim 26.

Therefore, such making of tapes by Minnesota in July 1946, ahead of the beginning of statutory year, could not have been a public use of the tape defined by claim 26, even on the erroneous assumption that such use was public rather than experimental.

CONCLUSION.

The Petition should be granted to apply properly to the facts the law of this Court and of the Statutes applicable thereto.

Respectfully submitted,

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CERTIFICATE OF COUNSEL.

I hereby certify that the foregoing petition for rehearing is presented in good faith and not for delay, and that it is restricted to the grounds specified in the Rules of the Supreme Court applicable hereto.

CARLTON HILL,
One of the Attorneys for Petitioner.

APPENDIX A.

Title 35 U. S. C.

§102. Conditions for patentability; novelty and loss of right to patent.

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

§103. Conditions for patentability; non-obvious subject matter.

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

§282. Presumption of validity defenses.

A patent shall be presumed valid. The burden of establishing invalidity of a patent shall rest on a party asserting it.

APPENDIX B.

ARMOUR RESEARCH FOUNDATION, ETC. AND MINNESOTA MINING AND MANUFACTURING COMPANY, *Plaintiffs-Appellants and Cross-Appellees,*

vs.

C. K. WILLIAMS & CO., INC., *Defendant-Appellee and Cross-Appellant.*

ARMOUR RESEARCH FOUNDATION, ETC., *Plaintiff-Appellant and Cross-Appellee,*

vs.

TECHNICAL TAPE CORPORATION, *Defendant-Appellee and Cross-Appellant.*

Nos. 12701-12706.

UNITED STATES COURT OF APPEALS
Seventh Circuit.
July 12, 1960.

On Petition for Rehearing
Aug. 30, 1960.

Before HASTINGS, Chief Judge, DUFFY, Circuit Judge, and MERCER, District Judge.

DUFFY, Circuit Judge.

Plaintiffs claim infringement of Camras Patent No. 2,694,656 issued on November 16, 1954, on an application filed July 25, 1947. The patent relates to magnetic recording, popularly known as "tape recording." The first sentence of the patent states: "This invention relates to

permanent magnet material and to a method of making the same." The patent explains this magnetic material is then impregnated or coated on a non-magnetic carrier to produce a magnetic impulse record member.

The Camras patent in suit was issued to Armour Research Foundation of Illinois Institute of Technology (Armour). Plaintiff Minnesota Mining & Manufacturing Company (3M) is the licensee under the patent, and has the exclusive right to grant sub-licenses. Defendant C. K. Williams & Co., Inc. (Williams) produces oxides for magnetic recording tape. Defendant Technical Tape Corporation (Technical Tape) uses those oxides in its production of magnetic recording tape.

Six claims are relied upon by plaintiffs (3, 8, 10, 14, 25 and 26). Claims 8, 10 and 14 call for methods of making "permanent magnetic material" or "oxides." Claim 3 refers to a ferromagnetic iron oxide material adapted to form an element of a magnetic impulse record member. Claim 25 refers to ferromagnetic oxide selected from a group consisting of synthetic ferrosoferric oxide and of a synthetic gamma ferric oxide, adapted to form an element of a magnetic impulse record member. Claim 26 provides: "A magnetic impulse record member having a non-magnetic carrier and a coating adherently bonded thereto of a binder and magnetic material, said magnetic material being the ferromagnetic iron oxide defined in Claim 25, and having a B_r versus H characteristic that rises most rapidly at fields between 200 and 600 oersteds and relatively slowly at fields between 0 and 200 oersteds and at fields above 600 oersteds."

It is interesting to note that there were no "record member" claims in the Camras application between November 29, 1948 when the first group of such claims was cancelled after rejection, and April 29, 1954, a period of about 5½ years.

Williams is charged with infringing claims 3, 8, 10, 14, 25, and contributory infringement of claim 26. Technical Tape is charged with infringement of claims 3, 25 and 26.

The District Court devoted four weeks to hearing and considering the extensive trial testimony. The oral testimony of sixteen witnesses was heard. The deposition testimony of ten other witnesses was considered. The trial court also had the advantage of courtroom demonstrations. The District Court prepared a detailed and carefully considered opinion which, with findings of fact and conclusions of law, may be found in 170 F. Supp. 871.

The Court found 1) that to a person skilled in the art, the magnetic iron oxide and method of producing it claimed in the patent were disclosed by several prior art references; 2) that all of the claims including the record member claims are lacking in invention, and the record member claims are not proper combination claims; and 3) that the claimed oxide was known, used and placed on sale in one instance, and the oxide was in public use in another, more than a year prior to the filing of the Camras application.

The Court dismissed the complaints in the consolidated actions. The Court also dismissed the two counterclaims of defendant Williams. One was for a declaratory judgment holding the patent invalid and not infringed. Although this counterclaim was dismissed, it was, in effect, sustained by the Court's holding of invalidity of the patent in suit. The second counterclaim alleged misuse of the patent and asserted violation of the antitrust laws. Williams has cross-appealed from the dismissal of its counterclaims, and both defendants cross-appealed from a part of the judgment offsetting costs and failing to award attorneys' fees.

The art of magnetic recording is based upon the fact that a magnetic member (magnetic impulse record mem-

ber) may be varyingly magnetized to record a varying electric current signal, such as from a microphone, which is sent through the winding of an electromagnet when said member is moved across a pole of the magnet. For playback, the member so magnetized is, in turn, moved across the pole of an electromagnet to generate a varying electric current in the winding thereof, so the signal originally recorded may be reproduced. In order to suppress background noise and to produce a better response, a bias current is ordinarily employed to impress a bias field on the signal field.[1]

Initially, commercial magnetic recorders in the United States used wire as a recording medium. As early as the 1930's magnetic recorders were used in Germany, where tape was used as the recording medium. The tape was coated or impregnated with magnetic iron oxide. Immediately following World War II, the Brush Development Company of Cleveland, started production of a magnetic recorder known as the "Soundmirror." It used a tape with a low coercive magnetic oxide.

While the work on the Soundmirror was going on, Indiana Steel Products Company produced a tape recorder using a tape with high coercive force (about 250 oersteds) magnetic powder having particle sizes in the one micron range. After examining the Indiana Tape Recorder, Armour negotiated in an effort to obtain exclusive rights to the Indiana machine and medium. Indiana refused to commit itself to an exclusive arrangement. After the introduction of the *Brush* tape recorder, Armour set out to make a tape recorder of its own that "would use the same basic ideas as are now employed in our wire recorders" and planned to bring Indiana under an Armour's license agreement.

1. Bias is a magnetic field added to the magnetic field of the signal being recorded, in order to obtain increased fidelity in recording.

In 1945, Camras began extensive experimentation which plaintiffs claim led to the invention of the patent in suit. Plaintiffs say the patent in suit discloses and claims an improved magnetic recording tape; improved magnetic iron oxides which constitute the magnetic material of the tape; and methods assuring the production of such oxides embodying those magnetic and physical characteristics found by Camras to be necessary to achieve the improvements named.

All the twenty-six claims of the patent have one characteristic in common. They call for a "synthetic" magnetic iron oxide powder of the well-known classes of ferrosoferric oxide, Fe_3O_4, and gamma ferric oxide, Fe_2O_3, which is characterized as having a coercive force of at least 200 oersteds.[2] Although plaintiffs several times emphasized that the iron oxide powder was synthetic, the term "synthetic" was not incorporated into the claims until more than four years after the date of the patent application. The word "synthetic" is nowhere found in the specification.

Plaintiffs place great stress on what they call the "criteria" of the patent. They say that after Camras had made and tested a large number of tapes, certain magnetic criteria were developed which combined with the physical criteria as to particle, size and shapes of the oxides enabled Camras to show how to make a superior magnetic recording tape capable of faithfully recording and reproducing high frequency notes at slower tape speeds than previously used.

Plaintiffs assert important criteria of the patent are:

2. Coercive force, H_c, characterizes the resistance of a magnet to demagnetization. In magnetic recording, it is normal to use a saturation field of 1000 oersteds' intensity. The term "oersted" indicates a modern unit of magnetic field strength applicable to magnetic fields in free space such as air. This unit was formerly called the gauss.

1) a relatively high coercive force of 200 to 550 oersteds; 2) gentle slope of the lower bend of the B_r versus H curve[3] to a point about 250 gauss where the curve begins to rise rapidly; 3) a rapid rise from 250 to 600 oersteds; 4) a high remanence of above 500 gauss, and a B_m B_r ratio of less than 3 to 1; 5) a synthetic material comprised preferably of particles of less than 1.5 microns and not more than 6 microns in maximum dimension and consisting of acicular or elongated particles.

The patent discloses the close interrelationship between the oxides and the recording mechanism. The District Court stated this situation very well in the following language: "There is practically an inseparable tie between the recording machine and the media to be used therewith. A magnetic recorder is not complete nor operative to give its intended performance until the mechanism is supplied with media having the same form and magnetic characteristics of the media it was designed to use. The machine is tailored to use a recording media having particular characteristics. The media are manufactured to provide those characteristics."

Plaintiffs claim that after the commercial introduction of the Camras tape by 3M in 1947, it proved a great commercial success and supplanted tapes previously used. The testimony showed that by 1957, 3M sales of the tape covered by the patent exceeded $8,000,000 in value.

[1, 2] Many of the findings of the District Court on the question of validity were, in large part, based on testimony before the Court by expert, technical and fact witnesses. The tests and demonstrations gave the Court a keen insight as to the claims and contentions of the parties. Under such circumstances, we cannot consider the issues as though

3. This curve represents the residual or remaining magnetic characteristics left in the sample after the applied field has been reduced to zero.

we were a *nisi prius* court. We have, many times, pointed out that under such circumstances, Rule 52(a), Federal Rules of Civil Procedure, 28 U. S. C. A. is applicable, and we can only disregard such findings if they are clearly erroneous. *Hazeltine Research, Inc.* v. *Admiral Corp.*, 7 Cir., 183 F. 2d 953, 954-955; *Armour & Co.* v. *Wilson & Co.*, 7 Cir., 274 F. 2d 143, 156. We have frequently reminded the bar that factual matters in a patent case must be tried and decided by the trial judge in precisely the same manner as those of any other kind of a lawsuit, and the functions of this court of review are no different than they are in any other kind of a case. See *Armour & Co.* v. *Wilson & Co.*, *supra*, at pages 152, 156.

From the prior work of others, Camras knew or is charged with knowing, the usefulness in recording media, of high coercive force qualities. He knew similarly the desirability of using in magnetic tape, magnetic iron oxide powders of very small and uniform particle size and high coercive force, and of using elongated powder particles including acicular magnetic iron oxides. Camras also had constructive if not actual notice of the various magnetic iron oxides including synthetic materials and methods of preparation as had been disclosed in literature pertaining to magnetic iron oxide.

The same prior publications disclosed that magnetic iron oxides showing the highest values of coercive force are obtained by the chemical reduction of ordinary ferric oxides (known as non-magnetic red iron oxide, also called alpha ferric oxide) to ferrosoferric oxides (black iron oxide, Fe_3O_4, also called magnetite) at elevated temperatures, and that the ferrosoferric oxides so obtained show coercive force values of 200 oersteds or more by magnetic measurement.

These publications also disclosed that ferric oxide could be obtained by dehydrating alpha ferric oxide monohydrate.

$Fe_2O_3H_2O$. That material inherently forms as fine acicular crystalline particles of less than 2 microns in size. These publications also described process conditions which produces oxides of high coercive force. *Inter partes* demonstrations were carried out at Easton, Pennsylvania, based on prior publications including the teachings of Williams and Thewlis. The trial court found that such demonstrations produced oxides identical in properties claimed by Camras as his product invention.

Another prior publication was published in Germany in 1936, and is known as the Kraeber & Luyken publication. It discloses methods by which iron oxides may be reduced and oxidized in order to provide certain magnetic properties. The District Court found that at the *inter partes* demonstrations at Easton, an oxide identical to Camras' oxide was produced by following the disclosures of this publication.

The trial court discussed United States Department of Interior, Bureau of Mines' Bulletin 425. This Bulletin dealt with magnetic separation of ores, and at page 136, teaches the effect of heat treatment on iron oxides. The trial court found the teachings in this article disclosed to one skilled in the art that in order to obtain a high coercive force oxide, reduction temperatures of between 220° to 550° C. must be followed, and that overheating will destroy these magnetic properties.

The District Court pointed out that although the Patent Examiner referred to pages 88 to 95 of Bulletin 425, apparently no consideration was given to page 136 where the effect of heat treatment on the iron oxides was disclosed. The Court found the Williams and Thewlis, the Kraeber and Luyken, and the Bureau of Mines' publications (to the extent indicated), anticipated the oxides claimed by Camras as his invention, and that these publications were not

cited nor considered by the Patent Office as prior art publications.

Welo and Baudisch were prior workers in the field. Their article was published in 1934, and disclosed a method whereby synthetic magnetite may be obtained by the reduction of gamma monohydrate and alpha monohydrate. Plaintiffs seek to challenge the District Court's reliance upon this reference by saying the oxide particles were not shown to be "characteristically" acicular. An inspection discloses that many of the particles of Welo and Baudisch oxides are acicular. However, whether the oxides are predominantly acicular would seem to be immaterial. The use of oxides composed of acicular particles on recording tape was old. Camras admitted that the acicular form was not critical. This is also demonstrated by the fact that some of the claims in suit, such as 4 and 13, do not specify the shape of the particles at all.

The decision of the District Court on invalidity was based, in part, on the Johnson patent (British Patent No. 466,023) dated November 18, 1936. This patent is entitled "Improvement in the Manufacture and Production of Sound Record Carriers." The patent taught the use of synthetic magnetic iron oxides both Fe_3O_4 and gamma Fe_2O_3 in fine particle sizes of 1 micron or less, including synthetic oxides of acicular shape as a magnetic recording material on or in a non-magnetic carrier (tape). The patent stated that such an oxide having a favorable remanence and high coercive force was especially suited for use in sound recordings to obtain faithful reproductions of speech and music at reduced tape speeds.

The Johnson patent did not state numerical values of magnetic property measurements, nor did it disclose any magnetic oxides or methods of preparing same. Instead, it referred in general terms to certain methods of prepar-

ing suitable oxides and stated such methods "are known *per se.*" Workers were thus referred to the magnetic iron oxide art.

Plaintiffs argued that Johnson's reference to high coercive force meant force less than 200 oersteds. However, by following the methods of preparing oxides which were "known *per se*," magnetic oxides showing coercive force values of 200 oersteds and higher could be obtained by anyone who wanted them.

The OSRD report No. 5325 of June 30, 1945, had described basic principles of the magnetic recording process, and had referred to the tendency of high coercive force, in the recording media to favor reproduction of high frequency signals. It described the development of coated wire media showing coercive force measurements of 300 oersteds. It also mentioned that better results had been obtained with flexible tapes using synthetic magnetic iron oxides then available commercially, and which had particle sizes of less than 1 micron, and coercive force measurements of 100 to 200 oersteds.

[3] We think and so hold, that the oxide and method claims of the Camras patent are clearly invalid over the prior art hereinbefore discussed. The same is likewise true of the record member claims especially in view of Johnson and the teachings of OSRD report 5325. In our view, the claims at issue of the patent in suit were fully anticipated by a number of the prior publications, and are completely lacking in invention over others. We hold there is credible evidence to support the Court's findings and conclusions with respect to the prior art.

The trial court held that a certain transaction hereinafter narrated which occurred in April, 1946, and in the

period immediately following, amounted to a prior public use of the oxides in suit, and was a statutory bar to the validity of the patent.[4]

April, 1946, was more than a year prior to the filing date of the Camras patent. In that month, 3M disclosed to Armour a magnetic oxide tape and asked Armour if it was interested in the use of magnetic tape for recording. Armour advised 3M it had experimented with tapes using oxides having a considerably higher coercive force than those shown to Armour by 3M. A sample of Armour's tape was given to 3M which caused tests to be made of the oxide as coated on the tape. Thereafter, 3M requested and Armour furnished ten pounds of oxides for the use by 3M in coating tapes. This material was received by 3M prior to July 12, 1946, and was used in coating tapes. The trial court found as a fact that the oxides furnished by Armour to 3M were the same oxides later patented by Camras.

Plaintiffs argue that this transaction was merely an experimental use as contrasted with a public use. Plaintiffs argue Camras did not have suitable equipment for making rolls of tape and 3M made some small sample rolls which it sent to Camras for testing. Plaintiffs point out no money changed hands and urge that no commercial transaction was involved.

[4] The question is not without difficulty. While a public use more than a year prior to the application date would defeat a patent, an experimental use would not. Whether the use by 3M was experimental, poses a very close question. It is apparent that the use by 3M of the oxides did have some aspects of an experimental use. In his testimony, Camras described the tapes as "experi-

4. Title 35 U. S. C. § 102 provides: "A person shall be entitled to a patent unless * * * (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States."

mental samples." None of the tapes were actually sold. The unused oxide was returned.

In *Elizabeth* v. *Pavement Co.*, 97 U. S. 126, 24 L. Ed. 1000, the use was held to be experimental and not an invalidating public use. There, the invention related to highway pavement. The pavement constructed under the patent was installed in a toll road and used publicly for a period of six years. The Supreme Court held it was an experimental use emphasizing the owner of the patent actually controlled his invention; that he built the road at his own expense; and that his day-to-day conduct indicated he intended to apply for a patent when he was satisfied that no further improvements were necessary.

However, in support of the Court's findings, the record before us discloses that neither Camras nor Armour sought the aid of 3M in connection with oxides or their use on tapes. In April of 1946 there was no cooperative relationship between Armour and 3M. The latter was already interested in the magnetic tape business, and it made its contact with Armour in furtherance of its own commercial interest. Armour built a kiln to produce the oxides in larger quantities. While plaintiff scoffs at the meager ten pounds of oxide sent to 3M, the record discloses that such an amount was sufficient to coat ninety 1200-foot reels of ¼ inch tape.

[5] The unrestricted deliveries and the use of the oxides by 3M having been shown as well as the shipment of the oxides to Du Pont Company on June 20, 1946, the burden fell upon plaintiffs to establish that any use made of such oxides was experimental. We hold there is sufficient credible evidence in the record to support the trial court's findings that the use made by 3M of the oxides was a public use, and the conclusions drawn by the trial court on that point were correct.

[6] As early as December, 1941, George S. Mepham

Corporation had produced synthetic oxides. They were not, at that time, used in making magnetic recording media. These oxides were numbered MTR-1 and MTR-12, and were subsequently re-designated 277 and 278, respectively. These oxides were tested in 1942 by Magnaflux Corporation, and found to be highly magnetic and suitable for their purpose. However, they were not then used because of the cost involved. Mepham retained the oxides and in 1947 forwarded these oxides with others to Brush Development Company for use in recording media.

Subsequent tests in 1955 disclosed that MTR-1 (277) had an H_c of 330 oersteds at a field of 1000 oersteds, B_m B_r ratio of less than 2 to 1, and a rapid rise from 300 to 400 oersteds. Oxide MTR-12 (278) had a coercive force, H_c, of 240 oersteds at a field of 1000 oersteds, a B_m B_r of less than 3 to 1, and a rapid rise between 300 and 400 oersteds. The particle size of both materials was found to be less than 1 micron in maximum dimension and to be acicular in shape. The trial court found the activities of Mepham constituted public use as well as an offer of sale. There is support in the record for such findings.

Although the Court found only an offer of sale, we think such finding brings the case at bar within the decisions of this Court in *Wende* v. *Horine*, 225 F. 501, 505, and *Magee* v. *Coca-Cola Company*, 7 Cir., 232 F. 2d 596, 600, in which it was held that the statute does not require a "sale" but only a "placing 'on sale'."

There is ample support in the record for the findings of the trial court as to the activities of Mepham, and we hold that the Mepham oxides were an anticipation of the tape oxide claims in the patent in suit.

The trial court discussed other bases for its decision of invalidity of the patent in suit, including the record mentor claims thereof. It would unduly prolong this

already lengthy opinion to say more than that the findings of the trial court with respect thereto are supported by the evidence, and we can find no error in the conclusions drawn.

With its answer, Williams filed a first and a second counterclaim. The latter was later thrice amended. The first counterclaim included a prayer for a declaratory judgment which was, in effect, sustained by the Court holding the patent in suit to be invalid. It also incorporated the claim that Armour and 3M had obtained a sweeping monopoly as to magnetic recording tape and magnetic iron oxide, and alleged plaintiffs' conduct created an "*in terrorem*" in the trade. This latter charge was not pressed on this appeal.

The second counterclaim alleges a violation by Armour and 3M of the antitrust laws of the United States, particularly §§ 1 and 2 of the Sherman Anti-Trust Act, 15 U. S. C. A. §§ 1, 2. Later, an amended second counterclaim was filed.

It is alleged in the amended second counterclaim that 3M dominates the magnetic recording tape industry, being the largest producer of such tape in the world. It is also alleged the magnetic recording industry has grown from infancy at the time of World War II to one of the major industries in this country. The counterclaim describes Armour's policy of issuing restricted licenses after its agreement with 3M, and which it is claimed has resulted in a situation whereby 3M is now the only Armour licensee engaged in the business of manufacturing magnetic tape in the United States.

The amended second counterclaim alleges an agreement between Armour and 3M in 1947 whereby 3M would file a patent application with the idea that an interference would be declared in the patent office with the application for the

patent in suit. In a memorandum by 3M it was stated: "If interference develops it could be handled on a perfectly friendly basis."

3M did file its patent application on February 16, 1948 in the names of Smith, Wetzel and Herr who swore they had invented both the black and gamma oxides of high coercive force and "record members" containing them. Two substitute applications, one for the black oxide, and one for the gamma oxide, were filed in 1950 with similar oaths. The trial court found Smith never believed that he had invented either oxide. The interference proceeding, which was in the nature of shadow boxing, was carried on for nearly two years before being terminated privately by 3M's concessions of priorities to Camras. It was at this time Armour agreed to restraints upon its future conduct of its licensing system.

We are handicapped in considering the second amended counterclaim by the brief manner in which the trial court referred to the issues raised thereby. The trial court's opinion, findings and conclusions in this case occupy forty-one pages of the printed appendix. All issues pertaining to the validity of the patent were considered in great detail and we have approved the trial court's findings and conclusions in reference thereto. By comparison, the reference to the counterclaim issues is contained in a few short paragraphs.

It is a practical impossibility for us to carefully examine the more than five thousand pages of the printed appendices to pick out testimony and evidence that might pertain to the issues raised by the counterclaims. We have considered the possibility of sending the case back to the trial court for additional findings on such issues. However, we finally have determined that there are sufficient findings and conclusions before us so that we can now pass upon such issues.

[7] The trial court found that there has been no price-fixing or patent-pooling or cross-licensing; also there has been no use of a patent or patents to control the manufacture, use or sale of unpatented articles or materials, nor has there been any attempt to force others to buy only the patented products. The Court also found there has been no joint control of any licensing program between plaintiffs Armour and 3M.

There was considerable evidence which would have justified contrary findings, but again, we must accept such findings unless clearly erroneous, and there is in the record before us credible evidence to support the Court's findings on these issues. Certainly, we cannot say that such findings are clearly erroneous.

The same holds true of the Court's finding that the defendants did not prove the alleged misuse of the patent in suit. We hold the trial court was correct in concluding that misuse of the patent in suit and violation of the anti-trust laws by plaintiffs were not sufficiently established by the proof.

[8] A question has been raised as to the provision in the judgment referring to costs. Although we think defendants should have been awarded costs without any offsets, we defer to the trial court in that respect. However, we invite the trial court's attention to the provision in the judgment whereby Technical Tape's costs are to be offset by costs incurred by plaintiffs in defending the counterclaims. Inasmuch as Technical Tape did not interpose a counterclaim, its costs should not be offset.

Judgment affirmed.

On Petition for Rehearing.

PER CURIAM.

We have authorized the entry of an order denying the petition for rehearing filed by plaintiff Armour and also denying the petition for rehearing filed by defendant Williams.

We invite the attention of the District Court to the matter of costs in that Court. We stated in our opinion that defendants should have been awarded costs without offsets, but we would defer to the trial court in that respect.

[9] On the petition for rehearing, Williams points out that paragraph 9 of the judgment seems to authorize an offsetting of plaintiffs' costs in defending the first counterclaim. This was for a declaratory judgment of invalidity and non-infringement. Although in form dismissed, the counterclaim was in effect sustained by the Court's holding of invalidity of the patent in suit.

If a differentiation can be made as to costs in defending the first and second counterclaims, it is clear there should be no offset as to the defense of the first counterclaim.